Congressional Research Service
Informing the legislative debate since 1914

IN FOCUS

Updated December 13, 2024

U.S.-China Science and Technology Cooperation Agreement

On January 31, 1979, weeks after the United States and the People's Republic of China (PRC, or China) established diplomatic relations, U.S. President Jimmy Carter and PRC leader Deng Xiaoping signed the U.S.-China Science and Technology Cooperation Agreement (STA), the first major agreement between the two governments. The STA is not a treaty requiring Senate ratification. The STA was a part of U.S. strategy at the time to counter the influence of the Soviet Union by building ties with China. During the 1980s and 1990s, U.S. strategy vis-a-vis China shifted toward enhancing science and technology (S&T) ties (**see text box**) as part of a broader U.S. effort to integrate China into the global system and influence its development trajectory and behavior. President Barack Obama expanded S&T ties with China to address global challenges in areas such as health, energy, and climate change. Since then, the U.S. posture toward China has increasingly emphasized protecting and advancing U.S. interests in the context of China as a strategic competitor. STA proponents and critics both say that the current STA did not reflect this U.S. policy shift or U.S. concerns about PRC S&T practices and industrial policies. Some say the most recent STA did not address China's growing technological capabilities and restrictive and potentially risky operating environment for cross-border research.

When the STA was set to lapse in August 27, 2023, the parties signed successive six-month extensions to provide time for negotiating new terms. The STA lapsed on August 27, 2024. On December 13, 2024, the Department of State announced that parties had signed a protocol to amend and extend the STA for five years. Congress might consider its oversight role with regard to the STA, including U.S. STA-related activities and negotiations with China.

STA Provisions

Stated objective: to provide opportunities for cooperation in S&T fields of mutual interest, thereby promoting S&T progress for the benefit of both countries. Cooperation is to be "on the basis of equality, reciprocity, and mutual benefit." Both parties are to promote, where appropriate, mutually beneficial activities.

Types of activities: exchange of scientists, scholars, specialists, and students; exchange of scientific, scholarly, and technological information; and joint projects, research, courses, conferences, and symposia; among others.

Implementing accords: may describe the nature of cooperation, responsibilities for activity costs, and treatment of information derived from STA cooperation, including intellectual property (IP) rights. Information from STA projects is to be made publicly available unless otherwise agreed. Activities are subject to the laws and regulations of each country.

External participation: scientists, technical experts, and entities of third countries or international organizations at U.S. and PRC invitation.

Governance: a U.S.-PRC Joint Commission on Scientific and Technological Cooperation (JCM), with co-chairs appointed by each country, is to plan and coordinate activities. The JCM includes senior officials from the technical agencies of both countries. The U.S. executive agent is the Office of Science and Technology Policy (OSTP); the PRC agent is China's Ministry of Science and Technology (MOST). The JCM is to meet once a year, alternating between countries. Full meetings led by the heads of OSTP and MOST typically occur every two years, with other years limited to an S&T Executive Secretariat.

Duration: initially five years, subject to modification or extension by the parties. Prior to the December 2024 extension, the STA was last extended on June 27, 2018 and included amendments to address U.S. concerns about China's approaches to technology, innovation, and practices (e.g., lax IP enforcement, IP theft, and forced technology transfer).

Sub-agreements: an estimated 30 agency-level protocols and 40 sub-agreements accompany the STA in areas that include agriculture; basic science; biomedical research and health; energy; environment; earth, atmospheric, marine sciences and remote sensing; standards and metrology; nuclear fusion and safety; and transportation. The Departments of Agriculture, Energy, and Health and Human Services have the most agreements.

Broad Functions of STAs

The U.S.-China STA is an umbrella agreement that governs U.S. government S&T work with China and is part of a broader S&T ecosystem of universities, firms, professional bodies, and nongovernmental organizations. The Department of State Office of S&T Cooperation, which negotiates and oversees U.S. STAs, says that STAs and related activities "strengthen international cooperation in scientific areas aligned with American interests, ensure open data practices, promote reciprocity, extend U.S. norms and principles, and protect American intellectual property." The United States has 60 bilateral and multilateral STAs—including with the European Union (and separately with certain EU member states), Japan, South Korea, Australia, Brazil, and Canada—and over 2,000 sub-agreements.

U.S. and PRC Views of the Agreement

The United States has used the U.S.-China STA as a tool to deepen diplomatic ties, address global challenges, and advance science. Advocates say it guides U.S.-China S&T cooperation without mandating activity; provides access and protections for U.S. scientists in China, including in the social sciences (where access has been more restricted); and benefits U.S. researchers by providing access to large pools of research subjects and longitudinal health studies. China's cooperation has not been consistent, however, as it has developed S&T competencies and sought to further restrict U.S. researcher access in certain areas. STA critics say that China is an unreliable or untrustworthy research partner, citing data restrictions and a lack of forthrightness in sharing scientific results. For example, China reportedly has previously withheld influenza strains required for U.S. flu vaccines. In 2019, China cut off access to U.S.-funded coronavirus work at the Wuhan Institute of Virology.

Some observers assess that China takes a competitive approach to innovation and has used the STA to catch up in

its own S&T capabilities. They argue that the state's role in China's economic and research ecosystems has allowed the PRC to leverage and shape S&T ties with the United States to fill research gaps, develop competencies and IP in priority areas targeted in its industrial policies, and develop PRC talent. The STA has provided the framework for PRC students and scholars to study in the United States, a phenomenon central to China's S&T advances. In 2023, an estimated 25% of international graduate students in the United States were from the PRC (124,350 students) compared to a reported 469 U.S. students studying in China. Some say the decentralized and open approach to S&T that characterizes the U.S. research ecosystem, while beneficial to U.S. innovation, has hindered the U.S. ability to effectively oversee and leverage S&T ties with China, including restricting China from gaining sensitive capabilities. In 2017, U.S. patent and trademark officials identified over 400 PRC patents tied to STA projects that the PRC commercialized without U.S. commercial benefit.

In 2009, U.S.-China S&T activity saw new agreements on joint projects in electric vehicles (EV), energy efficiency, renewable energy, coal, and shale gas, and the creation of the U.S.-China Clean Energy Research Center (CERC), a ten-year research effort between the U.S. Department of Energy and China's MOST. CERC involved over 1,000 participants from U.S. universities, national labs and industry. U.S. and PRC program officials lauded the effort, pointing to clean energy advances, and the former head of MOST characterized it as a model STA project. A number of U.S. firms and stakeholders, however, asserted that CERC's focus on commercializing emerging technologies ignored concerns about sharing foundational U.S. IP and fostered PRC competitive advantages in areas such as EVs.

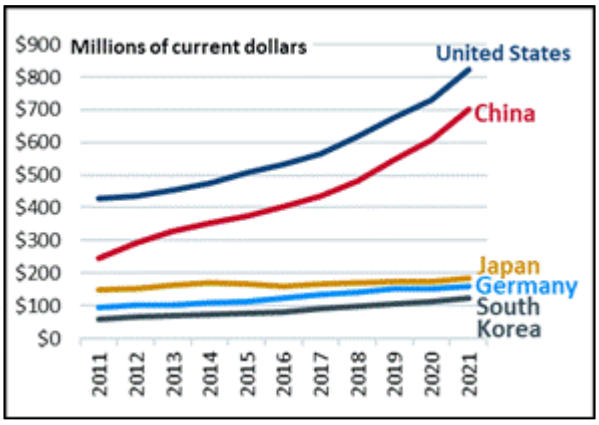
Rise of China: A Changing Global S&T Landscape.

China's global S&T position has changed substantially since 1979, when China lagged behind most developed nations in S&T. In 1991, China ranked seventh in research and development (R&D) funding among countries reporting data to the Organisation for Economic Cooperation and Development (OECD). By 2021, the most recent year for which comprehensive data are available, China ranked second in R&D investments, behind the United States (**Figure 1**).

China has emerged as a leading patent holder, source of academic papers, and home to technology-intensive industries, although some U.S. and PRC experts have questioned the integrity and quality of some research. Measured by co-authored scientific research papers, U.S. collaboration with China exceeds U.S. work with other partners, such as Germany, Japan, and the United Kingdom. China's trajectory has benefitted from its ties with advanced S&T partners in the United States, Japan, and several European countries. China is also deepening S&T ties with developing countries. China's 14th Five-Year Plan (2021-2025) prioritizes basic research capabilities to advance China as a global center for S&T research. It focuses on strengthening foreign research ties to achieve these goals.

National S&T and innovation capabilities are central components of intensifying U.S.-China strategic competition. Risks and benefits of joint research with China today are different than in 1979, when the STA was first signed. STA proponents say that China's enhanced S&T capabilities provide greater incentives to U.S. researchers and that exiting the agreement could slow U.S. S&T advances. Skeptics say that the agreement and the structure of joint research benefits China asymmetrically, especially in S&T areas that the PRC has prioritized. They caution that China may increasingly exclude the United States from key parts of its S&T sector as it gains competencies, as it has done in other sectors. Many stakeholders urge U.S. policymakers to consider the ways in which China has used the STA to advance its ambitions to become a global S&T leader and to develop technology and military capabilities.

Figure 1. Gross Expenditures on R&D for Top 5 R&D Funding Nations, 2011-2021



Source: CRS analysis of OECD data.
Notes: Adjusted for purchasing power parity which uses a basket of goods and services to equalize prices among countries.

Issues and Options for Congress

Congress may consider whether to enact oversight authorities over the STA and its negotiations as it has in the past. Such oversight could include reconstituting reporting requirements, requiring State to provide all sub-agreements and notify Congress of any future sub-agreements, and requiring an assessment of U.S. research work with China performed under the STA. Congress may also consider the future of the STA agreement, including whether it should be extended at the end of the current five-year term and, if so, according to what terms.

Section 1027 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (P.L. 107-314), for example, required the President to create an interagency process and a repository for S&T agreements with China. Section 1207 directed the State Department to track all protocols and, until Congress repealed the reporting provision in 2016, required the Departments of State, Defense, and Commerce and the Central Intelligence Agency to report to Congress biennially on how the U.S.-China STA benefits the PRC economy, military, and industrial base, including the role of technology transfer and compliance with U.S. export controls.

Proposed legislation has included requiring State to notify Congress 30 days prior to entering, renewing, or extending an STA with China (e.g., S. 2894 and H.R. 5245; 118th Congress).

Karen M. Sutter, Specialist in Asian Trade and Finance
Emily G. Blevins, Acting Section Research Manager

Disclaimer